

**Abstract of the Disclosure**

This invention pertains to a panelized modular construction system which employs a variety of square, rectangular and triangular panel shapes related to each other, being derived from a common grid subdivided cube. Combining these shapes of thickness practical for architectural application, these panels must be capable of being joined in many different angles and combinations along their sides, and in an unlimited combinations of angles at their corners. This construction system eliminates the strut and node framework typically found in many modular structures based on the geometry of various polyhedral forms. Located in the space between the sides of panels being joined, are simple connecting elements, independent of the panels, employed so as to join panels to each other in a manner that easily accommodate varying numbers and dihedral angles through almost 360 degrees. At the corners, the same versatility is achieved through a variation of the independent connecting element configurations, which allow panel corners to be joined in a manner that creates a structural hub, replacing the node connector typically found in prior art construction systems.

**Reference Numerals**

- 10 Primary Square - area bound by four equal sides, joined at right angles, to serve as initial format for developing Fractionalized Cube geometry.
- 12 Line used to delineate sides and perimeter of the primary square
- 14 Subsquare - smaller proportional square drawn within a larger primary square
- 16 Lines used to subdivide the primary square into subsquares and the primary cube into subcubes
- 18 Vertice - point on both two and three dimensional grids where lines which define planes and volumes intersect
- 20 Square subdivided into 9 equal subsquares
- 22 Primary cube - a symmetrical three dimensional simple polygon, comprised of six squares joined at right angles, which lines of equal length, delineating the perimeter, are all joined at 90 degrees
- 24 Subcube - a smaller proportional cube, 27 of which make up the larger primary cube
- 26 Square(s) - two dimensional planes defined by four equal length lines joined at 90 degrees, prevalent within the Fractionalized Cube grid described in FIG. 2A
- 28 Rectangle(s) - two dimensional plane(s) defined by two pairs of parallel lines of different lengths joined at 90 degrees, prevalent within the Fractionalized Cube grid described in FIG. 2A
- 30 Right Triangles - triangles in which two sides are joined at 90 degrees defined within the Fractionalized Cube grid described in FIG. 2B

- 32 Rectangles 28 defined on the Fractionalized Cube grid as described in FIG. 2C
- 34 Right triangles 30 defined within the Fractionalized Cube grid as described in FIG. 2D
- 36 Isosceles triangles - triangles comprised of two equal and one unequal length lines defined within the Fractionalized Cube grid as described in FIG. 2E
- 38 Irregular triangles - triangles comprised of three unequal length lines defined on the Fractionalized Cube grid as described in FIG. 2E
- 40 Cube forms that can be defined on the 27 - subcube, i.e., Fractionalized Cube grid, up to and including the primary cube
- 42 Tetragonal primitive polygons that can be defined within the primary cube, Fractionalized Cube grid
- 44 Orthorhombic primitive polygons that can be defined within the primary cube, Fractionalized Cube grid
- 46 Isosceles prism - triangular polygons with two pair of symmetrical sides that can be defined within the primary cube, Fractionalized Cube grid
- 48 Right triangular prism polygons that can be defined within the Fractionalized Cube grid within the primary cube
- 49 Research study model trestle feature
- 50 Reference scale indicating 6 inches
- 52 Axis - line connecting any two vertices on a grid or in structural assemblies. Axes refer to more than one axis

- 54 Dihedral angle - dihedral - the angle between any two adjoining planes (panels) about a common axis
- 56 Plane - two dimensional surface
- 58 Area - square, rectangular or triangular in shape, defined by struts, that may be open space or infilled to become a solid panel
- 60 Panel - surface of material thickness spanning between, attached to or incorporating the struts so as to divide and define space
- 62 Radian - line emanating from any given vertice towards other points on a grid or in a structural assemblage; coincident with axes at the centerline of struts, or spokes, between and at angles with respect to vertices or nodes at said vertices
- 64 Node - a physical element centered on the vertice to which struts, centered on axes between vertices, are anchored
- 66 Strut - a structural, linear member that spans between two vertices in any given polyhedral configuration; they may be separate, exposed members or incorporated into and concealed in panel construction
- 67 Distance between the axis line between vertices and strut-panel side in a structural assemblage
- 68 Centerline element - an open ended cylinder or short length of tubing
- 70 Web - a structural, planer member parallel to the axis between two vertices that protrudes from the centerline of the panel sides in line with said axis at the corners of panels

- 72 Bracket - a structural planer element attached perpendicular to the sides of strut-panel and the axis, forming a bridge between said strut-panel side and the cylindrical tubular segment - centerline element centered on said axis
- 74 Collar - short cylindrical element with two protrusions, called tabs, extending parallel to each other along one side of the cylinder designed to unite the tube segment - (centerline element) with the web component of a joinery assembly
- 76 Line illustrating dimensional perimeter of panel selected from the 59 panel inventory FIG. 2A - 2E, defined by the Fractionalized Cube grid, also represents the location of axes between adjoining panels. Corners and intersection of lines 76 represent the location of actual vertices between adjoining panels.
- 78 Hub - a structural assemblage comprised of the first joinery assembly elements at panel-strut corners, anchored to like components of only those panels being joined about a common vertice, effectively replacing a physical node-connector, normally positioned at the vertice location
- 80 Dowel - solid rod, wood or metal, depending on application, typically used as a structural tie in conventional construction
- 82 Steel plate
- 84 Concrete foundation
- 86 Anchor bolts - commonly used to tie construction superstructures to concrete foundations
- 88 Attachment hardware - represents bolts, screws, rivets and other standard fasteners used to connect various independent components to each other

- 90 Joint closure - membrane spanning between panels being joined so as to enclose the joint cavity, joinery mechanism and any wiring or other utilities located within the joint assembly
- 92 Brace - a stiffening element that may be required under certain conditions to strengthen web and bracket bridge elements in their respective joinery assemblies
- 94 Handrail - residential design feature
- 96 Entrance canopy
- 98 Angle bay window
- 100 Deck
- 102 Planter

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